



**PRODUCT MANUAL
FOR AGRO TEXTILES - LAMINATED HIGH DENSITY POLYETHYLENE (HDPE) WOVEN
GEOMEMBRANE FOR WATER PROOF LINING – SPECIFICATION
ACCORDING TO IS 15351:2015**

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	Product	:	IS 15351:2015
	Title	:	Agro textiles - Laminated High Density Polyethylene (HDPE) woven Geomembrane for water proof lining – specification
	No. of Amendments	:	NIL
2.	Sampling Guidelines:		
a)	Raw material	:	HDPE Tapes, and HDPE Fabric shall conform to the requirements given in Cl. 3 of IS 15351:2015
b)	Grouping guidelines	:	NA - Sample of each type to be tested to cover the same in the scope of licence.
c)	Sample Size	:	Please refer Annex –A
3.	List of Test Equipment	:	Please refer Annex –B
4.	Scheme of Inspection and Testing	:	Please refer Annex –C
5.	Possible tests in a day :	:	Dimensions and Visual Examination
6.	Scope of the Licence :		
	Licence is granted to use Standard Mark as per IS 15351:2015 with the following scope:		
	Name of the product	Agro textiles - Laminated High Density Polyethylene (HDPE) woven Geomembrane for water proof lining	
	Type	Type I/II/III/IV	

ANNEX-A
PRODUCT MANUAL
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SAMPLE SIZE

S. No.	Sample	Referred Cl. Of IS 15351	Size Recommended	Remarks
1	HDPE Tape	3.1	3 bobbins	In case the waterproof lining is to be used for drinking water, the tape used for lamination shall be of food grade quality (see IS 10146).
2	HDPE Woven Fabric (Unlaminated)	3.2	1 pc.	Roughly 1 m x 1m
3	laminated HDPE Woven Geomembrane with different layer separated (As separation of different layer is not possible after the pond lining has been manufactured)	5.1.1 (Coating lamination thickness)	1 pc.	Roughly 1 m x 1m. Also see Cl. 5.1.3 of IS 15351.
4	Laminated HDPE Woven Geomembrane (Finished Good)	5 and 6	1 pc. of declared dimension by the firm.	Including Panel width, joints/seams as applicable.

ANNEX-B
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LIST OF TEST EQUIPMENTS
Major test equipment required to test as per the Indian Standard

S. No.	Test Equipment	Tests used in with Clause Reference
1.	Eye lens (with scale)	Materials - 3.1
2.	Weighing Balance with an accuracy of 0.1 mg	Materials -3.1, Mass- 6.2
3.	Measuring tape, up to 1% accuracy relative to dimensions	Dimensions -6.2
4.	Dead weight thickness tester with a) interchangeable presser foot of defined circular and place area (> 70 mm ²) b) reference plate, c) gauge with accuracy of 1 % d) dead weight of 2 ± 0.01 kPa.	Thickness - 5.1.1, 6.2
5.	Tensile testing machine (CRT/CRE/Extensometer)	Breaking Load - 6.2
6.	CBC tester apparatus with Furnace	Carbon Black Content - 6.2
7.	Impact Tester with weights (3 kg, 2 x 1000 g, 2 x 500 g, 2 x 300 g, 2 x 200 g, and 2 x 100 g)	Impact Failure Load Test - 6.2
8.	Tear test apparatus	Tear Resistance - 6.2
9.	Puncture testing attachment to tensile machine	Puncture Resistance - 6.2
10.	Bursting strength tester	Bursting Strength - 6.2
11.	Mullen type hydrostatic tester	Hydrostatic Resistance – 6.2
12.	Xenon Arc Apparatus (for UV exposure)	UV Exposure - 6.2
13.	Compressive block jaws for Seam strength	Seam Strength - 6.2
14.	Muffle furnace (590± 10 ⁰ C), Weighing balance of least count 0.001gm, Silica crucibles, Bunsen burner, silica triangle and tripod, Desiccator and Gloves and crucible Holder	Ash Content –6.2
15.	Ventilated Drying Oven ,Stop watch, Humidity chamber, Thermometer, GSM cutter	Requirements -6.2

The list above is indicative and may not be taken as exhaustive

ANNEX – C

**SCHEME OF INSPECTION AND TESTING
FOR AGRO TEXTILES - LAMINATED HIGH DENSITY POLYETHYLENE (HDPE) WOVEN
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1. **LABORATORY** - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.
 - 1.1 The manufacturer shall prepare a calibration plan for the test equipment.
2. **TEST RECORDS** – The manufacturer shall maintain test records for the tests carried out to establish conformity.
3. **PACKING AND MARKING** – The Standard Mark as given in the Schedule of the license shall be printed indelibly on each geomembrane or on a label affixed to it; provided that geomembranes to which this mark is thus applied conforms to every requirement of the specification.
 - 1.1 Marking and packing shall be done as per the provisions of the Indian Standard. In addition In addition, the following details shall be mentioned on each geomembrane or on a label affixed to it:
 - a) BIS Licence No. CM/L _____.
 - b) BIS website details i.e.–“For details of BIS certification please visit www.bis.gov.in”
4. **CONTROL UNIT** – For the purpose of this scheme, all laminated woven geomembrane of the same type manufactured from same batch of HDPE fabric (using same variety of unlaminated basic fabric) manufactured under similar conditions in a day shall constitute a control unit.
5. **LEVELS OF CONTROL** - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.
 - 1.2 All the production which conforms to the Indian Standard and covered by the licence should be marked with Standard Mark.
2. **REJECTIONS** – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

**Table 1 LEVELS OF CONTROL
(Scheme of Inspection and Testing)**

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
3.1	HDPE Tapes	3.1	IS 15351	S	10	Every four hour of production	Samples from 10 different spindles is to be taken. See Note 3
3.2	HDPE Fabric	3.2	-do-	S	1	-do-	Sample from different loom is to be taken. See Note 3
5.1, 5.1.1, 5.1.2, 5.1.3	Lamination	5.1, 5.1.1, 5.1.2, 5.1.3	-do-	R	1	Every two hour of production	Sample from different lamination machine is to be taken.
5.2	Panel width	5.2	-do-	R	1	Every four hour of production	-
5.3	Joints/Seams	5.3	-do-	R	1	Every four hour of production	Sample from different jointing/seaming machine is to be taken.
6.1	Workmanship	6.1	-do-	R	Each roll/piece	-	-
6.2	Table 1						
(i)	Thickness	-	IS 7016 (Pt 1)	R	5	Every control unit	-

(ii)	Mass	-	-do-	R	5	Every control unit	-
(iii)	Dimension (length & width)	Annex A	IS 11652	R	Each roll/piece		-
(iv)	Carbon black content	-	IS 2530	R	3	Every control unit	-
(v)	Breaking load before U.V exposure	-	IS 13162 (Part 5)	R	5	-do-	-
(vi)	Strain at maximum load	-	-do-	R	5	-do-	-
(vii)	Breaking load after U.V exposure	Annex B	Annex B of IS 15351 and IS 13162 (Part 5)	S	5	Once in a month	Sample for each type of geomembrane shall be tested
(viii)	Impact failure load	Annex C	IS 15351	R	2	Every control unit	-
(ix)	Tear resistance	-	Method A1 of IS 7016 (Part 3)	R	2	-do-	-
(x)	Puncture resistance	Annex D	IS 15351	R	2	-do-	-
(xi)	Bursting strength (Ball burst)	-	IS 7016 (Part 6)	R	2	-do-	-
(xii)	Seam strength before UV exposure	-	IS 15060	R	5	-do-	-
(xiii)	Seam strength after UV exposure	Annex B	Annex B of IS 15351 and IS 15060	S	5	Once in a month	Sample for each type of geomembrane shall be tested
(xiv)	Hydrostatic resistance	Annex E	IS 15351	R	3	Every control unit	-
(xv)	Hydrostatic resistance after UV exposure	Annex B and Annex E	IS 15351	S	3	Once in a month	Sample for each type of geomembrane shall be tested
(xvi)	Ash content	Annex F	IS 15351	R	3	Every control unit	-

Note-1: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empaneled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval to BO head.

Note-3: Conformity of HDPE Tape and Fabric to the requirements of the Indian Standard may be established either through in-house testing, or a test certificate issued by the supplier/manufacturer or test report issued by a laboratory recognized by the Bureau or Government laboratories empaneled by the Bureau